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The first chapter contains splendid definitions and a new classification of exercises of speed, effort and endurance. Chapters two to six are devoted to physiology of exercise; they contain the results of laboratory and clinical findings on the behavior of the muscles, heart, lungs, the organs of nutrition and excretion, and the nervous system during and after different forms of exercise; also, modifications produced by differences in age, sex and occupation.

The two chapters devoted to the effects of violent exercise on the heart are of particular interest at this time when the subject is the cause of widespread discussion by physicians, and educators, and giving much concern to the parents of boys and young men interested in athletics. After reviewing the literature on the subject and citing a number of cases from his own wide experience, Dr. McKenzie arrives at the following conclusion: "After the most severe strain one can seldom find any measurable injury in a week's time in a heart originally sound if the athlete has not passed thirty. It is in those unprepared for violent exercise, and especially when approaching middle life, that the danger of heart strain is most imminent."

A classification of athletic and gymnastic exercises and games on the basis of the regions of the body used; the demand on nerve control; the influence on pulse, blood pressure, and respiration; the physical characteristics cultivated; and the best age for practise should prove of great value to the individual and the practitioner in solving the problem of exercise for the sedentary man.

The remaining eleven chapters in Part I. treat in detail of the various systems of physical education in different countries, physical education and athletics in schools, colleges, municipal and philanthropic institutions, and the special methods applied to the training of the blind, deaf mute, and mental and moral defectives.

In Part II., the first three chapters treat of the application of exercise, massage, vibration, and passive exercise to pathological conditions. The remaining thirteen chapters deal with the treatment by exercise of flat-foot, club-foot,

round back, stooped and uneven shoulders, scoliosis, abdominal weakness and hernia, visceroptosis and constipation, diseases of the respiratory and circulatory organs, obesity, nerve pain and exhaustion, tic, stammering, chorea, infantile paralysis and locomotor ataxia.

The author has succeeded admirably in presenting clearly the methods of diagnosis and treatment of the various abnormal conditions which may be improved or corrected by exercise, manipulation and massage. The critical discussion of the various methods advocated for the treatment of hernia, scoliosis, diseases of the circulatory and respiratory organs, and obesity, is particularly valuable because of the author's long and successful experience in the treatment of these conditions.

A large number of diagrams, line drawings and photographs illustrating physical defects, exercises and equipment add materially to the value of the book. This book fairly represents the present status of physical education and mechano-therapy; its use as a guide and reference work by educators, teachers, physicians and other scientists interested in the physical development and improvement of man should aid materially in placing exercise on a scientific basis.

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*Electrical Engineering.* By CHARLES PROTEUS STEINMETZ. Fourth edition. Entirely revised and reset. 368 pp., 194 illustrations. McGraw-Hill Book Co.

Since the appearance in 1901 of Steinmetz's "Theoretical Elements of Electrical Engineering" the art of electrical engineering has progressed so rapidly that four editions of the book have been necessary to keep it up to date. The present edition is not merely a reprint from former ones but has been thoroughly revised and rewritten. Some matter which appeared in former editions has been withdrawn and new matter has been added with the idea of preserving the unity of the book and at the same time making it representative of theory and practise as it exists to-day.

The text is divided into two parts, the first

on general theory and second on the application of this theory to particular types of apparatus. In the part on general theory we note the author using the crank diagram for vector representation of alternating quantities. This departure from his previous custom (use of the polar diagram) is not due to the conviction that the crank diagram is superior to the polar (in fact the author still thinks the polar diagram preferable) but the crank diagram is used to make the text conform with the recommendations of the Turin International Electrical Congress. This change in Steinmetz's notation will undoubtedly be appreciated by engineering students who, in so far as the writer knows, never were able to see the superiority of the polar diagram and who were always somewhat confused in reconciling the almost universally used crank diagram with Steinmetz's pet, the polar diagram.

The second part of the text on Special Apparatus is opened with a brief analysis of the scheme of classification used in presenting the various machines. While the author's classification may upset some of our present notions, the sense of it is at once apparent and it will surely come into favor in the future. The electrical machines discussed fall into one or the other of five broad classes, each class embracing all machines operating on a given principle, whether motor or generator. These classes are: Synchronous machines, direct current commutating machines, synchronous converters, alternating current transformers and induction machines.

Many readers of electrical literature have all of Steinmetz's books; certainly every one should have at least this elementary text on alternating current circuits and machines.

J. H. M.

*Electrical Engineering.* By T. C. BAILLIE. Vol. I. Cambridge, University Press: G. P. Putnam's Sons. Pp. 236, 131 illustrations.

This text, dealing in an elementary fashion with electric circuits, machines and measurements, is intended as the introductory volume of a series of electrical texts being published in the Cambridge Technical Series.

On reading the book nothing new is found, either in subject-matter or method of presentation. There are several other books to be had which cover the same ground in practically the same way.

The title of the book is apt to mislead one regarding its contents; it might more suitably be called an introduction to the subject of electrical engineering. The work covered in the text is ordinarily given in a technical school by the department of physics, as will be evident from a brief review of the contents. The chapters are entitled: Currents of Electricity, Magnetism, Current Measurement, Electromotive Force, Resistance Measurement, The Potentiometer, Batteries and Electric Light.

The subject-matter is logically presented and is fairly well illustrated by original diagrams and cuts of commercial apparatus. To the layman desiring a knowledge of some of the underlying principles of electrical engineering or to the student attacking the subject for the first time, the text would be very helpful.

J. H. M.

*Electrical Instruments in Theory and Practice.* By W. H. F. MURDOCH and W. A. OSCHWALD. The Macmillan Co. 366 pp., 164 illustrations. \$2.75 net.

The writers of this excellent book evidently possess the two requisites for a successful text, mastery of the subject and the ability to express their ideas clearly. One is convinced on reading this book on meters that the authors have carefully considered the theory of the various instruments and have worked sufficiently with the meters themselves to grasp the errors which may occur and the ways in which they can best be eliminated. A very useful feature of the book consists of experimental data which is liberally given throughout to show how nearly the theory may be expected to agree with practise.

The first chapter gives a condensed history of the early attempts to measure electrical quantities; it serves well to give the student a proper appreciation of the modern metering devices.